

WHAT IS CLAIMED IS:

1. A method for manufacturing a semiconductor device comprising  
the steps of:

5 forming a non-single crystalline semiconductor film on a  
substrate having an insulating surface;

10 patterning said semiconductor film into a patterned  
semiconductor film having peripheral portions;

disposing a crystallization promoting material in contact with  
said semiconductor film either before or after said patterning, said

15 crystallization promoting material containing a metal;  
crystallizing said patterned semiconductor film provided with  
said crystallization promoting material by heating; and  
etching the peripheral portions of said patterned  
semiconductor film after said crystallizing.

2. The method according to claim 1 wherein said non-single  
15 crystalline semiconductor film is amorphous.

3. The method according to claim 1 wherein said heating is carried  
out at 450-700°C.

4. The method according to claim 1 wherein said heating is carried  
20 out at 800-1100°C and said substrate is a quartz substrate.

5. The method according to claim 1 wherein said semiconductor film  
comprises silicon.

6. A method for manufacturing a semiconductor device comprising  
the steps of:

forming a non-single crystalline semiconductor film on a  
substrate having an insulating surface;

5 providing defects and/or stress in a selected region of said  
semiconductor film;

disposing a crystallization promoting material in contact with  
said semiconductor film, said crystallization promoting material  
containing a metal;

10 crystallizing said semiconductor film provided with said  
crystallization promoting material by heating wherein said metal  
segregates in said selected region during the crystallization; and

etching said selected region after said crystallizing.

7. The method according to claim 6 wherein said non-single

15 crystalline semiconductor film is amorphous.

8. The method according to claim 6 wherein said heating is carried  
out at 450-700°C.

9. The method according to claim 6 wherein said heating is carried  
out at 800-1100°C and said substrate is a quartz substrate.

20 10. The method according to claim 6 wherein said defects and/or  
stress are provided by directing ions of phosphorous or oxygen into said  
selected region.

11. The method according to claim 6 wherein said semiconductor film comprises silicon.

12. A method for manufacturing a semiconductor device comprising the steps of:

5 forming a non-single crystalline semiconductor film on a substrate having an insulating surface;

providing defects and/or stress in a selected region of said semiconductor film;

10 disposing a crystallization promoting material in contact with said semiconductor film, said crystallization promoting material containing a metal;

crystallizing said semiconductor film provided with said crystallization promoting material by heating wherein said metal segregates in said selected region during the crystallization; and

15 forming an active region of said semiconductor device by etching at least said selected region after said crystallizing.

13. The method according to claim 12 wherein said non-single crystalline semiconductor film is amorphous.

14. The method according to claim 12 wherein said heating is 20 carried out at 450-700°C.

15. The method according to claim 12 wherein said heating is carried out at 800-1100°C and said substrate is a quartz substrate.

16. The method according to claim 12 wherein said defects and/or stress are provided by directing ions of phosphorous or oxygen into said selected region.

17. The method according to claim 12 wherein a distance d between 5 said selected region and a center of said active region is expressed by  $D/30$  to  $D$ , where  $D$  is a dispersion distance of said metal.

18. The method according to claim 12 wherein said distance d is from  $0.2 \mu\text{m}$  to  $2 \mu\text{m}$ .

19. The method according to claim 12 wherein said  $D$  is expressed 10 by  $D_0 \exp(-\Delta E/kT)$ .

20. The method according to claim 12 wherein said semiconductor film comprises silicon.

21. A method of manufacturing a semiconductor device comprising the steps of:

15 forming a non-single crystalline semiconductor film on an insulating surface;

directing ions of an element which is inert with respect to said semiconductor film into a selected region thereof;

disposing a crystallization promoting material in contact with 20 said semiconductor film;

crystallizing said semiconductor film by heating wherein said metal segregates in said selected region during the crystallization; and forming an active region of said semiconductor device by removing at least said selected region by etching.